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10/562,685

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EXAMINER

WHALEN, DANIEL B

ART UNIT

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4176

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                   |  |
|------------------------------|--------------------------------------|-----------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/562,685 | <b>Applicant(s)</b><br>VAL ET AL. |  |
|                              | <b>Examiner</b><br>DANIEL WHALEN     | <b>Art Unit</b><br>4176           |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 12-18 is/are rejected.
- 7) ☒ Claim(s) 9-11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 July 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/28/2005 and 08/15/2006</u> .                               | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

1. This action is a first Office action on the merits of Application Serial No. 10/562,685. Currently, claims 1-18 are pending.

#### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

#### ***Information Disclosure Statement***

The references cited within the Information Disclosure Statement (IDS) submitted on 12/28/2005 and 08/15/2006 have been considered by the examiner.

#### ***Specification***

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

### **Content of Specification**

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.
- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.
- (d) The Names Of The Parties To A Joint Research Agreement: See 37 CFR 1.71(g).
- (e) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.
- (f) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:
  - (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
  - (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."
- (g) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The

summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

- (h) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.
- (i) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (j) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (k) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).

- (l) Sequence Listing. See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

### ***Drawings***

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: reference sign “38” from fig. 3B is not mentioned in the description. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, “*the heterogeneously thinning the structure* by nonselective surface treatment of the polymer layer and at

least one passive component” in **Claim 1** and “*a step of rectifying* the polymer layer prior to the step of redistributing the terminals, to calibrate the thickness of the layer to a predetermined value and render the surface of said layer substantially flat and parallel to the support.” In **Claim 2** must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, Claim 13 reciting,



“producing thinned heterogeneous elementary components by the method as claimed in claim 12, the terminals being redistributed in particular toward the periphery, stacking and bonding the heterogeneous components, coating the stack with the aid of a polymer material, cutting the material to form, around said stack, a parallelepipedal block whose faces will expose the peripheral contacts of the active and passive components, depositing a metallization layer on at least a part of the faces, forming an interconnection network of the conductors by laser etching the metallization layer on the faces of the block.” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

7. Figure 5 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**Claims 1-3** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1, recites, "heterogeneously thinning the structure by nonselective surface treatment of the polymer layer and at least one passive component." And Claim 2-3 recites, "rectifying step comprises a first step of heterogeneously thinning the layer by nonselective surface treatment of the polymer

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layer and the passive component.” It appears that the “a step of rectifying” is the same and single step as the step of heterogeneously thinning the structure by nonselective surface treatment of the polymer layer and at least one passive component. Both “a step of rectifying” and “heterogeneously thinning the structure” is appeared to be doing the same step, thinning the polymer. If it is the two distinctive steps, applicant must provide that each step is distinctly and structurally different from one another.

For examining purpose, claim is interpreted as such that “rectifying the polymer layer” is the same step as “heterogeneously thinning the structure by nonselective surface treatment of the polymer layer and at least one passive component.”

### ***Claim Objections***

9. **Claims 1 and 17** are objected to because of the following informalities:

heterogeneous by definition from Merriam-Webster is “consisting of dissimilar or diverse ingredients or constituents.” It is unclear how the thinning can be done such a method that is heterogeneous. It is suggested that “heterogeneously thinning” is corrected to -- thinning -- in order to clarify the claim language.

10. **Claims 2-4** are objected to because of the following informalities: “rectifying” by definition from Merriam-Webster is to correct by removing errors. It is appears that using a word “rectifying” does not clearly define what the actual step of the method, which appears to be thinning step. Appropriate correction is required.

11. **Claims 17** is objected to because of the following informalities: Claim 17 recites “on two faces...on the other side,” appears to be out of place. Appropriate correction is required.

For examining purpose, “on two faces...on the other side,” is not considered.

***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. **Claim 1-4, 6-7 and 14-15** are rejected under 35 U.S.C. 102(b) as being anticipated by Fillion et al. (US 5,497,033; hereinafter “Fillion”).

13. **Regarding Claims 1-4**, Fillion teaches a method for the interconnection of active components and passive components provided with terminals for their interconnection, comprising the steps of:

positioning and fixing the active (item 20) and passive (item 14) components on a flat support (item 10), the terminals (item 15) being in contact with the support (fig. 1a; col. 4, line 59—col. 5, line 11),

depositing a polymer layer (item 24) on all of the support and the components (fig. 1.b; col. 5, line 48- col. 6, line 3),

removing the support (fig. 1.c; col. 6, line 30-41),

redistributing the terminals between the components and/or toward the periphery by means of metal conductors (item 32) arranged in a predetermined layout, to obtain a reconstituted heterogeneous structure (fig. 1.d-e; col. 8, line 7-27),

heterogeneously thinning the structure by nonselective surface treatment of the polymer layer and at least one passive component (fig. 1.a-e and fig. 8.a-b; col. 12, line 29-63).

Also, Fillion teaches a step of rectifying (step of thinning) the polymer layer prior to the step of redistributing the terminals, to calibrate the thickness of the layer to a predetermined value and render the surface of said layer substantially flat and parallel to the support (fig. 1.a-e and fig. 8.a-b; col. 12, line 29-63; applies to **Claim 2**).

wherein said rectifying step comprises a first step of heterogeneously thinning the layer by nonselective surface treatment of the polymer layer and the passive component (fig. 1.a-e and fig. 8.a-b; col. 12, line 29-63; applies to **Claim 3**); the surface treatment is carried out by nonselectively lapping and polishing (mechanical grinding) the polymer layer and the components (fig. 1.a-e and fig. 8.a-b; col. 12, line 29-63; applies to **Claim 4**).

**Regarding Claim 6**, Fillion teaches that said redistributing of the terminals step comprises depositing a photo-etchable insulating layer (item 29), etching said layer in a pattern corresponding to the positioning of the terminals, depositing a metal layer (item 32) and etching said metal layer according to the predetermined layout of the metal conductors (fig. 1.e; col. 8, line 13-28).

**Regarding Claim 7**, Fillion teaches comprising a prior step of thinning the passive components (fig. 8.a-b; col. 12, line 29-53).

14. **Regarding Claim 14**, Fillion teaches a thinned heterogeneous component, comprising:

a polymer layer (item 24) having two substantially plane and parallel surfaces with one polished face (mechanically ground rear face) and one unpolished face (front face) and, coated in said layer, an active component (item 20) and one passive component (item 14), the components having two faces (fig. 1.a), a first face provided with terminals (item 15) for interconnection of the components, the terminals of the set of components being connected by metal conductors (item 32) forming a flat support in contact with the unpolished surface of said layer, and a second face, said second faces of the set of passive components being polished so as to form a plane surface (see fig. 8a-b) homogeneous with said plane surface of the polymer layer (fig. 1a-e and fig. 8a-b; col. 4, line 59 – col. 5, line 11; col. 5, line 49- col. 52; col. 8, line 7-28; col. 12, line 29-63).

15. **Regarding Claim 15**, Fillion teaches a three-dimensional thinned heterogeneous component comprising two thinned heterogeneous components (item 859, 860) as claimed in claim 14 stacked on one another, separated by a layer (item 816) and having conductors (item 858) connected to the terminals of the active and passive components of each of the heterogeneous components and extending to the faces of the stack, and connections arranged on the faces of the stack for interconnection of the conductors (fig. 8.e; col. 13, line 41-59).

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. **Claim 5, 12, and 16-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion as applied to claims 1 and 14 above, and further in view of Nakamura et al. (US Pub 2002/0151103 A1; hereinafter "Nakamura").

18. **Regarding Claim 5**, Fillion teaches that the support includes an adhesive film (item 12a) and the removal step (fig. 2.a-b; col. 8, line 29-46). However, Fillion does not specifically disclose the details of removal step. Nakamura discloses that the removal is carried out by peeling the film (page 7, paragraph 141). Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to integrate the method of Fillion with peeling as taught by Nakamura as it is common technique for removing the adhesive material.

**Regarding Claim 12**, the combined teaching teaches the active and passive components being arranged on the support in order to form a set of identical patterns, furthermore comprising cutting (item 16, dicing from fig. 12 of Nakamura) the thinned

heterogeneous structure around said patterns, to obtain a corresponding number of identical thinned heterogeneous elementary components (fig. 11-12 and fig. 14a-b).

Note that It is known to one of the ordinary skill in the art that for integrated circuit module fabrication, a set of identical components (dies) are produced and diced to obtain a corresponding number of identical components.

**Regarding Claim 16**, teaching of Fillion has been discussed above. Also, Fillion teaches the three-dimensional thinned heterogeneous component as claimed in claim 15, wherein said layers (item 830, adhesive layer) and one or more of said thinned heterogeneous components (item 862) comprise passive components of the connecting wire type for connecting said thinned heterogeneous components to other stacked thinned heterogeneous components (fig. 8.e; col. 13, line 41-59). However, Fillion does not disclose that the layers are anisotropic conductive films. Nakamura discloses that the layers are anisotropic conductive films (ACF) (page 5, paragraph 100-103). Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to integrate the method of Fillion with ACF as taught by Nakamura as it is common technique for flip chip technology to adhere between chip and flip chip together.

19. **Regarding Claim 17**, Fillion teaches a method for the three-dimensional interconnection of active and passive components provided with terminals for their interconnection, comprising:



stacking and bonding a second active component on said first active component (fig. 8d-e; col. 13, line 41-59),

depositing a polymer layer (item 24) on all of the support and said components (fig. 1.b; col. 5, line 48- col. 6, line 3),

removing the support (fig. 1.c; col. 6, line 30-41),

redistributing the terminals between the components and/or toward the periphery by means of metal conductors (item 32), making it possible to obtain a reconstituted heterogeneous structure (fig. 1.d-e; col. 8, line 7-27),

heterogeneously thinning said structure by nonselective surface treatment of the polymer layer and the passive components (fig. 1.a-e and fig. 8.a-b; col. 12, line 29-63).

However, Fillion does not disclose that the terminals of said second component being on the opposite face from that in contact with the first component; and forming connections by connecting wires between the terminals of the second component and the contacts of the adapter. Nakamura teaches that the terminals of said second component being on the opposite face from that in contact with the first component (fig. 6b); and forming connections by connecting wires (item 4) between the terminals of the second component and the contacts of the adapter (item 3c) (page 4, paragraph 88-91). Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to integrate the method of Fillion with a limitation discussed above as taught by Nakamura as it is common technique for wire-bonding process.

20. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion and Nakamura as applied to claim 12 above, and further in view of Admitted Prior Art (Fig. 5; page 11, line 35 - page 12, line 5). Teaching of Fillion and Nakamura has been discussed above, However, the combined teaching does not disclose a method for the three-dimensional interconnection of active and passive components provided with terminals for their interconnection, comprising the steps of: producing thinned heterogeneous elementary components by the method as claimed in claim 12, the terminals being redistributed in particular toward the periphery, stacking and bonding the heterogeneous components, coating the stack with the aid of a polymer material, cutting the material to form, around said stack, a parallelepipedal block whose faces will expose the peripheral contacts of the active and passive components, depositing a metallization layer on at least a part of the faces, forming an interconnection network of the conductors by laser etching the metallization layer on the faces of the block.

Admitted Prior Art (APA) teaches disclose a method for the three-dimensional interconnection of active and passive components provided with terminals for their interconnection, comprising the steps of: producing thinned heterogeneous elementary components by the method as claimed in claim 12, the terminals being redistributed in particular toward the periphery, stacking and bonding the heterogeneous components, coating the stack with the aid of a polymer material, cutting the material to form, around said stack, a parallelepipedal block whose faces will expose the peripheral contacts of the active and passive components, depositing a metallization layer on at least a part of the faces, forming an interconnection network of the conductors by laser etching the

metallization layer on the faces of the block. Therefore, it would be obvious to one of the ordinary skill in the art at the time of the invention to integrate the method of Fillion and Nakamura with a further method discussed above by APA so as to form three-dimensional heterogeneous interconnection.

21. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion as applied to claim 1 above, and further in view of Hirano et al. (US Pub 2003/0222335 A1; hereinafter "Hirano"). Teaching of Fillion has been discussed above. However, although Fillion discloses that the passive component can be capacitor (col. 5, line 12-27), Fillion does not disclose that the passive component is a ceramic capacitor with a zone of even and odd interdigitated electrodes, two ceramic filling zones on either side of the electrode zone and two lateral end terminals to which the even and odd electrodes are respectively connected, the prior thinning step consists in thinning one of said ceramic zones in a plane parallel to the electrodes. Hirano discloses that the passive component is a ceramic capacitor with a zone of even and odd interdigitated electrodes (item 19), two ceramic filling zones (item 14) on either side of the electrode zone and two lateral end terminals (item 12) to which the even and odd electrodes are respectively connected, the prior thinning step consists in thinning one of said ceramic zones in a plane parallel to the electrodes (fig. 3A-3E; page 8, paragraph 87-94). Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to integrate the method of Fillion with a ceramic capacitor as taught by Hirano so as to improve the mounting characteristics.

22. **Claim 18** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion and Nakamura as applied to claims 17 above, and further in view of Oka et al. (US 6,441,495 B1; hereinafter "Oka"). Teaching of Fillion and Nakamura has been discussed above including the terminals of said second component being on the opposite face from that in contact with the first (lower) component (page 4, paragraph 88-91). However, the combined teaching does not disclose stacking and bonding at least one other active component on said second active component, forming connections by connecting wires between the terminals of each further component and the contacts of the adapter or the terminals of the lower component. Oka discloses stacking and bonding at least one other active component (item 2R) on said second active component (facing the same direction), forming connections by connecting wires (W) between the terminals of each further component and the contacts of the adapter or the terminals of the lower component (fig. 1; col. 1; line 10-24; col. 5, line 57-67). Oka Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to integrate the method of Fillion and Nakamura with a limitation discussed above as taught by Oka so as to increase the mounting density of the semiconductor devices.

***Allowable Subject Matter***

23. **Claims 9-11** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Whalen whose telephone number is 517-270-3418. The examiner can normally be reached on Monday-Friday, 7:30am to 5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Nguyen can be reached on (571) 272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/D. W./

Daniel Whalen

/Kiesha L. Rose/

Primary Examiner, Art Unit 2822